

TWO NEW SPECIES OF POLYPEDILUM (TRIPODURA) TOWNES FROM ORIENTAL CHINA (DIPTERA, CHIRONOMIDAE)

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Abstract *Polypedilum* (*Tripodura*) *bispinum* sp. nov. and *Polypedilum* (*Tripodura*) *spathum* sp. nov., are described as male imagines from South China. *P. (T.) bispinum* sp. nov. differs from other species of the subgenus *Tripodura* in having spatulate anal point, the straight superior volsella with two transverse spine-like setae and developed lateral projection of anal point covered with microtrichiae. The spatular-shaped superior volsella of *P. (T.) spathum* sp. nov. is characteristic in *Tripodura*; as well as the high fore leg ratio (2.63-2.89), high number of median setae (20-28) on tergite and the low number of setae (2-3) on the inferior volsella will separate *P. (T.) spathum* sp. nov. from other species in *Tripodura*.

Key words Chironomidae, *Polypedilum*, *Tripodura*, new species, Oriental China.

Introduction

Kieffer (1912) erected the genus *Polypedilum*. The genus is worldwide, except Antarctica. The larvae of *Polypedilum* occur in all standing and flowing waters, except at high altitude and latitude. It is a heterogeneous group with more than 430 recorded species (Sublette & Sublette, 1965; Freeman & Cranston, 1980; Cranston & Martin, 1989; Bidawid & Fittkau, 1995; Bidawid-Kafka, 1996; Sasa, 1998; Oyewo & Sæther, 1998; Sæther & Sundal, 1998; Maschwitz & Cook, 2000; Wang, 2000; Chaudhuri, Hazra & Alfred 2001). Adults of the genus can be recognized by the deeply bifid pulvilli combined with the triangular shaped eighth abdominal segment. The genus contains six subgenera: *Polypedilum* s. str. Kieffer, 1912; *Pentapedilum* Kieffer, 1913; *Tripodura* Townes, 1945; *Asheum* Sublette & Sublette, 1983; *Uresipedilum* Oyewo & Sæther, 1998 and *Cerobregma* Sæther & Sundal, 1998.

In recent years, the authors carried out a systematic review on subgenera *Uresipedilum* Oyewo & Sæther, *Cerobregma* Sæther & Sundal and *Pentapedilum* Kieffer from China (Zhang & Wang, 2004; 2005a, b). The male imagines of the subgenus *Tripodura* Townes can be easily separated from other subgenera by having a trifid anal point or at least shoulders to each side of the anal point / or superior volsella without apical extension. Up to now, about 141 species of the subgenus have been recorded (Sublette & Sublette, 1965; Freeman & Cranston, 1980; Cranston & Martin, 1989; Bidawid & Fittkau, 1995; Bidawid-Kafka, 1996; Wang, 2000; Chaudhuri, Hazra & Alfred 2001; Vårdal et al., 2002). Six species are known from China according to Wang (2000) and Zhang et al. (2006). In this paper, we describe two new species of the subgenus *Tripodura* Townes 1945 from

China.

Methods, Terminology and Material

The morphological nomenclature follows Sæther (1980) with the additions and corrections given by Sæther (1990). The material examined was mounted on slides following the procedure outlined by Sæther (1969). Measurements are given as ranges followed by a mean when there are two or more measurements, followed by the number measured (n) in parentheses. All the material examined in this paper is deposited in the Department of Biology, Nankai University, China (BDN).

Polypedilum (*Tripodura*) *bispinum* sp. nov. (Figs. 1-5)

Type material. Holotype male (BDN No. 05880), China, Hainan Province, Lishui County, Diaoluo Town, 20 May 1988, light trap, WANG Xin-Hua.

Etymology. From Latin, bi, two and spina, spine, referring to two strong spines in the inner margin of the superior volsella.

Diagnostic characters. The species differs from other species of *Tripodura* in having spatulate anal point, straight superior volsella and developed lateral projection of anal point covered with microtrichiae.

Male imago (n = 1)

Total length 1.86 mm. Wing length 1.08 mm. Total length/wing length 1.73. Wing length/length of profemur 2.34.

Coloration. Head brown with yellow palpomere. Thorax brown with darker vittae, postnotum and preepisternum; scutellum yellowish brown; halteres brown. Abdominal segments entirely brown. Femur of

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all legs with dark basal part and paler apices. Fore legs : tibiae and tarsi pale. Mid legs : tibiae with pale basal and darker apices , tarsi brown. Hind legs : tibiae yellow , tarsomeres and brown at basal 1/2 , yellow at distal 1/2 , tarsomeres and brown , tarsomeres yellowish brown.

Head. AR 0.82. Ultimate flagellomere 310 μm long. Temporal setae 9. Clypeus with 12 setae. Tentorium 85 μm long 15 μm wide. Palpomere lengths (in μm) : 30; 25; 53; 73; 125.

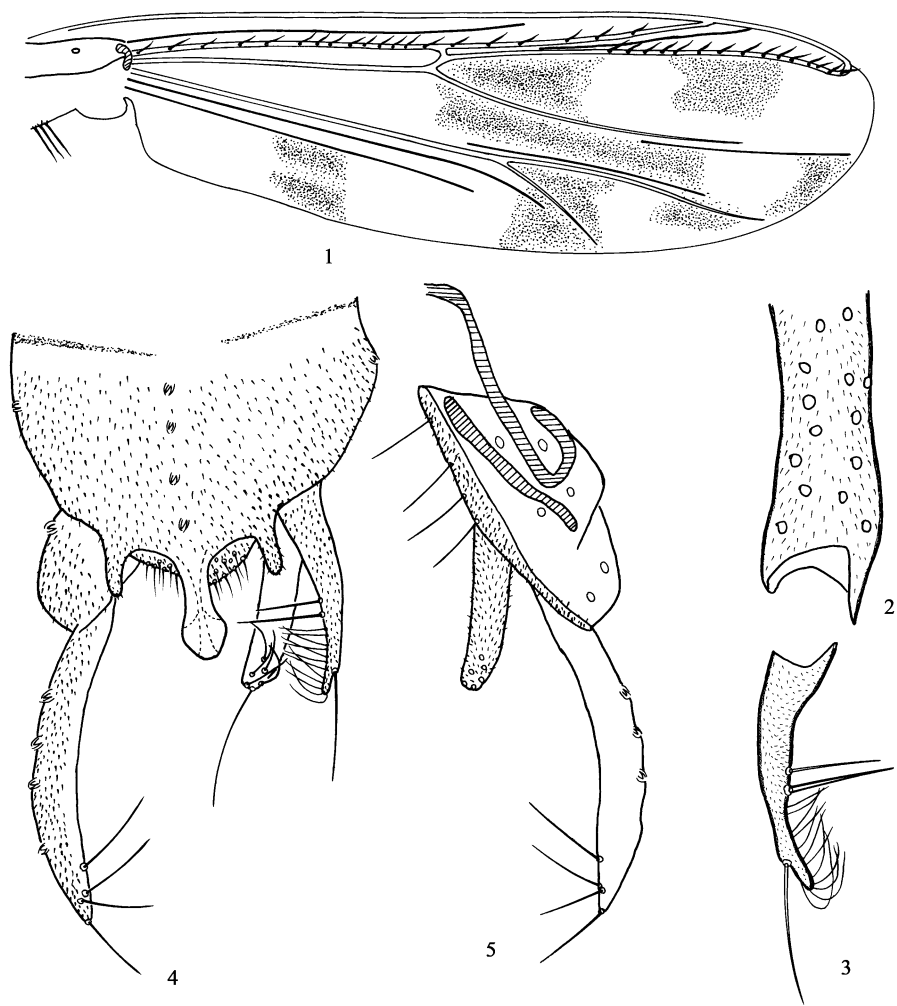
Wing (Fig. 1). VR 1.29. R with 14 setae ; R_1 with

6 ; R_{4+5} with 15. Squama with 3 setae.
Thorax. Dorsocentrals 11 ; acrostichals 8 ; prealars 3. Scutellum with 7 setae.

Legs. Terminal scale (Fig. 2) of front tibia 21 μm long , triangular ; spur on median tibiae 36 μm long including 16 μm long comb , un-spurred comb 13 μm long , spur on posterior tibia 44 μm long including 21 μm long comb , un-spurred comb 18 μm long. Width at apex of front tibia 31 μm , of middle tibia 29 μm , of hind tibia 39 μm . Lengths (in μm) and proportions of legs as in Table 1.

Table 1. Lengths (in μm) and proportions of legs of *Polypedilum* (*Tripodura*) *bispinum* sp. nov.

	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR
p ₁	462	294	546	368	263	221	105	1.86
p ₂	536	347	210	111	64	34	23	0.61
p ₃	557	462	326	189	137	80	53	0.71



Figs. 1-5. *Polypedilum* (*Tripodura*) *bispinum* sp. nov. , male imago. 1. Wing. 2. Fore tibial scale. 3. Superior volsella. 4. Hypopygium , dorsal view. 5. Hypopygium , ventral view.

Hypopygium (Figs. 3-5). Tergite with 4 median setae , arranged in a line. Laterosternite with 2 setae. Anal point broad , 30 μm long , lateral projections 16 μm long covered with microtrichiae. Phallapodeme 39 μm

long ; transverse sternapodeme 21 μm long. Gonocoxite 86 μm long. Superior volsella (Fig. 3) 65 μm long , with 2 strong transverse inner setae at the apex 1/2 and 1 outer subapical setae , about 12 slender apical setae present at

half part to apex. Inferior volsella 50 μm long , with 5 oral setae and an apical seta. Gonostylus 86 μm long , with 3 long setae along inner margin and 1 apical seta. HR 0.85. HV 1.84.

Distribution. The species was collected in Hainan Province (Oriental China).

Remarks. The species closely resembles *P. (T.) nudiprostatum* Zhang & Wang, 2006 in the shape of hypopygium and the value of fore leg ration but differs from the latter in having lanceolate anal point , wing with two spots in cell r_{4+5} , apex of cell m_{1+2} and m_{3+4} clouded , lateral projections of anal point covered with microtrichiae , the inner setae of superior volsella situated at distal 1/2. While in *P. (T.) nudiprostatum* Zhang & Wang , wing with one spot in cell r_{4+5} , apex of cell m_{1+2} and m_{3+4} clear , anal point is broad , lateral projections of anal point bare and strongly sclerited , the inner setae of superior volsella situated at distal 1/4.

Vårdal et al. (2002) revised the Afrotropical members of *Tripodura* and also did a phylogenetic analysis of all previous described species. In their key to Afrotropical species *P. (T.) bispinum* sp. nov. keys to couplet 28 , but will not key further since the superior volsella is more elongate. *P. (T.) aegyptium* Kieffer appears to be the most similar species based on the data matrix and the species most likely can be placed in the *aegyptium* group.

Polypedilum (Tripodura) spathum sp. nov. (Figs. 6-10)

Type material. Holotype male (BDN. 06753) , China, Yunnan Province , Mengla County , Menglun Town , 12 Apr. 1987 , light trap , ZOU Huan-Guang. Paratypes 13 males as the holotype.

Diagnostic characters. The spatula-shaped superior volsella of the species is characteristic for some species of *Tripodura*. The high fore leg ration (2.63-2.89) , high number of median setae (20-28) on tergite and low number of setae (2-3) on the inferior volsella will

separate the species from other Chinese species of *Tripodura*.

Etymology. From Latin , *spatha* , *spatula* , referring to the shape of the superior volsella.

Male imago (n = 8 , when otherwise stated)

Total length 2.59-2.92 , 2.74 mm. Wing length 1.57-1.70 , 1.64 mm. Total length/wing length 1.59-1.75 , 1.67. Wing length/length of profemur 1.95-2.06 , 1.98.

Coloration. Head yellow to brown. Thorax yellowish brown , with darker postnotum , median anepisternum and preepisternum , halteres yellow. Fore femora yellow with apical brown ring ; mid and hind femora brown at base and apex , yellow in the middle ; all tibiae and tarsi brown. Abdominal segments brown with pale posterior margin.

Head. AR 1.32-1.58 , 1.44. Ultimate flagellomere 609-725 , 666 μm long. Temporal setae 9-11 , including 2-3 , 3 inner verticals , 4-5 , 5 outer verticals and 1-3 , 2 postorbitals. Clypeus with 14-22 , 18 setae. Tentorium 104-130 , 122 μm long , 16-26 , 19 μm wide. Palpomere lengths (in μm) : 31-42 , 39 ; 39-47 , 43 ; 109-117 , 113 ; 114-133 , 125 ; 195-218 , 209.

Wing (Fig. 6) . VR 1.12-1.32 , 1.26. R with 20-25 , 22 setae ; R_1 with 16-21 , 18 ; R_{4+5} with 35-43 , 39. Squama with 4-6 , 5 setae.

Thorax. Dorsocentrals 11-17 , 14 ; acrostichals 17-24 , 20 ; prealars 4-5 , 5. Scutellum with 12-16 , 14 setae.

Legs. Terminal scale (Fig. 7) of front tibia 42-52 , 49 μm long , triangular and with pointed apex. Spur on median tibiae 52-65 , 57 μm long including 23-31 , 27 μm long comb , un-spurred comb 21-29 , 24 μm long , spur on posterior tibia 57-65 , 62 μm long including 23-34 , 29 μm long comb , un-spurred comb 23-26 , 25 μm long. Width at apex of front tibia 42-49 , 47 μm , of middle tibia 49-52 , 51 μm , of hind tibia 47-62 , 56 μm . Lengths (in μm) and proportions of legs as in Table 2.

Table 2. Lengths (in μm) and proportions of legs of *Polypedilum (Tripodura) spathum* sp. nov.

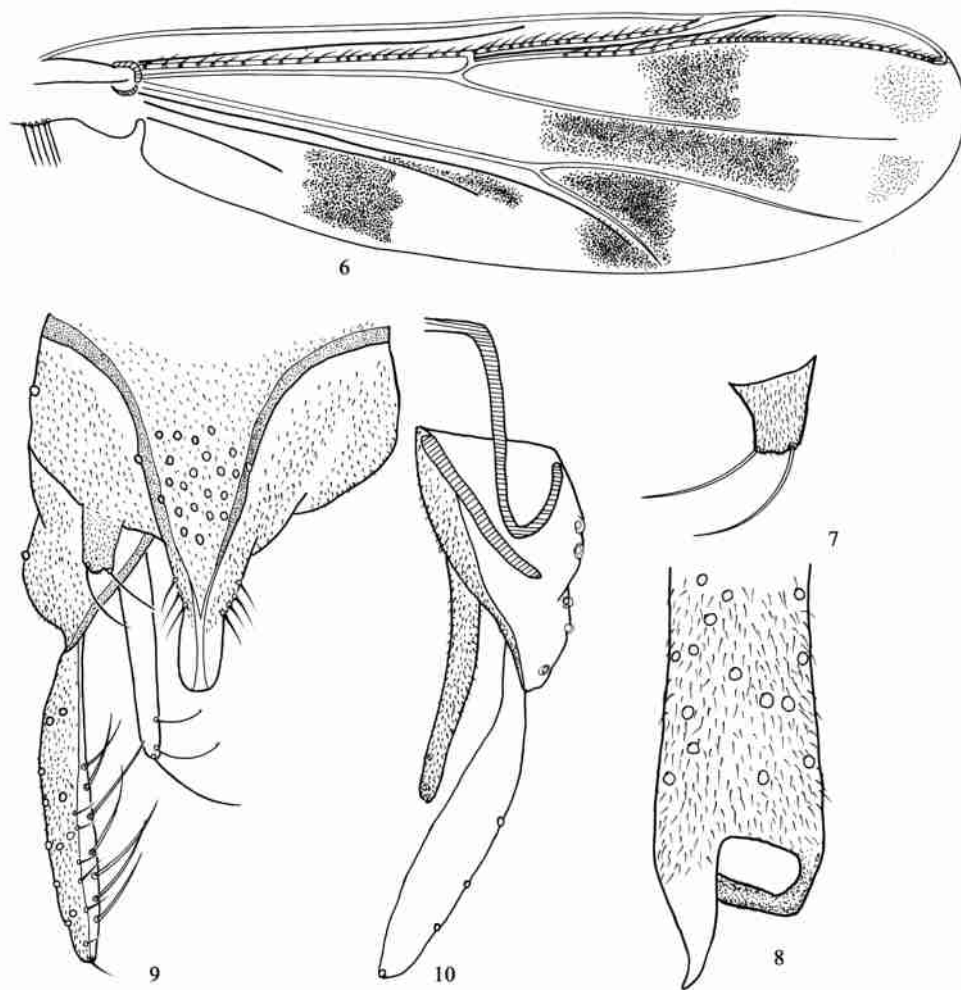
	fe	ti	ta ₁	ta ₂	ta ₃	ta ₄	ta ₅	LR
p ₁	777-872 , 831	336-452 , 415	1 071-1 242 , 1 164 (6)	588-651 , 630 (6)	431-452 , 442 (4)	357-378 , 368 (4)	179-189 , 184 (4)	2.63-2.89 , 2.75 (6)
p ₂	861-956 , 912	683-809 , 729	389-441 , 413-242	210-244 , 218	158-180 , 164	95-106 , 99	64-69 , 68	0.51-0.59 , 0.57
p ₃	914-998 , 958	756-819 , 781	557-704 , 618 (6)	305-336 , 319 (6)	242-263 , 253 (5)	147-158 , 155 (5)	84-137 , 94 (5)	0.73-0.88 , 0.78 (6)

Hypopygium (Figs. 8-10) . Tergite with 20-28 , 25 median setae. Laterosternite with 2-3 setae. Anal point 58-72 , 65 μm long , broad , apically rounded ; lateral projection absent. Phallapodeme 68-86 , 75 μm long ; transverse sternapodeme 34-47 , 40 μm long. Gonocoxite 130-146 μm long. Superior volsella (Fig. 2C) spatula-shaped with 2 setae on apical margin. Inferior volsella slender , 101-112 , 106 μm long , with one apical seta and 2-3 oral directed setae. Gonostylus 133-153 , 141

μm long , with 6-7 long setae along inner margin. HR 0.90-1.06 , 0.97. HV 1.80-2.04 , 1.97.

Distribution. The species is known only from the type locality (Oriental China).

Remarks. In the key to Afrotropical species in Vårdal et al. (2002) the species will key to *P. (T.) amplificatus* Bjørlo. However , it is more similar to *P. (T.) albosignatum* Kieffer differing in the wing markings and shape of superior volsella. The most similar species



Figs. 6-10. *Polypedium (Tripodura) spathum* sp. nov., male imago. 6. Wing. 7. Fore tibial scale. 8. Superior volsella. 9. Hypopygium, dorsal view. 10. Hypopygium, ventral view.

based on the data matrix is *P. (T.) alboguttatum* Kieffer and the species can be placed in the *alboguttatum* group.

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中国东洋区三突多足摇蚊亚属两新种（双翅目，摇蚊科）

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摘 要 记述了我国东洋区三突多足摇蚊亚属（Tripodura Townes）2 新种。

双刺多足摇蚊 Polypedilum (Tripodura) bispinum sp. nov. (图 1 ~ 5)

本种与裸突多足摇蚊 P. (T.) nudiprostatum Zhang & Wang 相似，区别在于此新种 r_{4+5} 翅室具有 2 个翅斑， m_{1+2} 和 m_{3+4} 翅室端部具云状斑，肛尖矛尖状，肛尖侧突覆有微毛，上附器内侧中部具 2 个刺状刚毛。

正模，海南黎水县吊罗镇，1989-05-20，灯诱，王新华采。

关键词 摇蚊科，摇蚊属，三突多足摇蚊亚属，新种，中国东洋区。
中图分类号 Q969.442.6

抹刀多足摇蚊，新种 Polypedilum (Tripodura) spathum sp. nov. (图 6 ~ 10)

本种可借如下特征区别于本亚属已知种：上附器呈抹刀形；前足比高（2.63-2.89，2.75）；第 9 背板中部刚毛少，2 ~ 3 根；下附器长、刚毛少，具 2 ~ 3 根刚毛。

正模，云南勐腊县勐伦镇，1987-04-12，灯诱，邹环光采。

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